AMENDMENTS

Please amend the specification as indicated hereafter. It is believed that the following amendments and additions add no new matter to the present application.

In the Specification: [Use ~~strikethrough~~ for deleted matter (or double square brackets "[[]]" if the strikethrough is not easily perceivable, *i.e.*, "4" or a punctuation mark) and <u>underlined</u> for added matter.]

<u>In the paragraph beginning on page 8, line 1:</u>

Thus, the system of the present invention provides two tiers of authorization and authentication. The ~~firsr~~ <u>first</u> tier, validation of the subscriber's USERID and password, are required for the subscriber to establish the initial telephone connection with the system. In one embodiment of applicant's system, establishment of the initial telephone connection over the telephone line is sufficient for the user to conduct, for example, an Internet session as is currently done in the prior art with a conventional modem and a convention telephone connection. This level of service does not, however, utilize the full features of Application's invention with respect to providing high data rates back to the subscriber over the cable television network. The higher level of service requires the second tier of authorization involving the validation of the electronic serial number.

<u>In the paragraph beginning on page 9, line 12:</u>

FIG. 1 shows the physical components of cable data network 100 in a preferred embodiment. Cable data network 100 transfers data packets with IP addresses between Internet 150 and hosts 108, which in a preferred embodiment are ~~Pcs~~ <u>PCs</u> or work stations. Cable data network 100 also transfers packets with IP (Internet Protocol) addresses among the components of cable data network 100 and uses Internet 150 to exchange data packets with IP addresses between cable data network 100 and remotely-located control and management components 111. These components typically deal with functions such as receiving information about new subscribers or billing.

In the paragraph beginning on page 12, line 6:

When packets are to go to a host 108 via cable 132, they are routed to communications manager 102, which puts the packets into the proper form for transport by that link-level network. FIG. 2 shows how data is transported on cable 132 in a preferred embodiment. Cable 132 is an RF medium 401 which carries data in a fixed number of channels 403. Each channel 403 occupies a portion of the range of frequencies transported by cable 132. Within a channel 403(i), data moves in superframes 405. Each superframe contains a superframe header 414 and a fixed number of fixed-sized superpackets 407. The only portion of the superframe header that is important to the present discussion is stream identifier (STRID) 415, which is a unique identifier for the stream of data carried on channel 403. The combination of a channel's frequency and the stream identifier 415 uniquely identifies the network to which cable 132 belongs in the CATV system. As will be explained in more detail later, this unique identification ~~of~~ the network cable 132 belongs to is used by communications manager 102 to determine which network should receive the IP packets intended for hosts 108 connected to a given RF modem 106(i).

In the paragraph beginning on page 13, line 17:

Returning to communications manager 102, that component receives IP packets 301 addressed to hosts 108 connected to networks whose link layers are cables 132 connected to head end 105 and routes them to the proper RF modems 106 for the hosts. It does by relating the IP address of an active host 108 to one of the networks and within the network to a <channel,pipe,linkID> triple specifying the RF modem 106 to which the host 108 is connected. As employed in the present context, an active host is one that currently has an IP address assigned to it. Using the information in the routing table, communications manager 102 makes superframes 405 for each channel 403(i) in the network containing cable 132[[ ]]. The superframes contain superpackets 407 directed to the RF modems 106 connected to that channel for which communications manager 102 has received IP packets 301. The superframes are stored in a dual-ported memory which is accessible to QPR modulators 103.

In the paragraph beginning on page 16, line 23:

Continuing with the portion of the link level that is implemented using the public switched telephone network, modem chip 517 in RF modem 106 is connected by means of a standard analog telephone line 131 to public switched telephone network 109, and RF modem 106 can thus call other telephone numbers via PSTN 109 and be called from other telephone numbers in PSTN 109. In the present case, when RF modem 106 wishes to set up a session that will permit it to transfer IP packets 301 for a host 108, it calls a telephone number for telephone modem pool 135. The modem pool responds by assigning a telephone modem (Tmodem) 110 to RF modem 106 and assigning RF modem 106 an IP address. As shown in FIG. 1, telephone modem pool 135 is also connected to LAN 120 in head end 122. Telephone modem pool 135 serves as a router with respect to LAN 120 and the telephone connections currently being served ~~as~~ by the tmodems 110 in the modem pool. Once a telephone modem 110 and an IP address have been assigned to RF modem 106, RF modem 106 may send IP packets 301 to the devices connected to LAN 120 and

receive IP packets 301 from those devices.

In the paragraph beginning on page 19, line 4:

A problem in the design of networks that employ IP addresses is that the IP addresses are only 32 bits long. The maximum number of address is consequently 2.sup.32, and the enormous growth of the Internet has resulted in a shortage of IP addresses. One of the techniques that cable data network 100 employs to reduce the number of IP address needed in cable data network 100 is the dynamic assignment of IP addresses to hosts 108 in network B ~~208(i)~~ and of the <channel,pipe,link ID> triples used to specify destinations of data in cable 132 to RF modems 106(j). By dynamic assignment is meant here that the IP addresses in a given subnetwork C ~~210(j)~~ and the <channel,pipe,link ID> triple listened to by RF modem 106(j) are assigned to RF modem 106(j) for the period of time that RF modem 106(j) is active. When RF modem 106(j) is not active, the IP addresses are available for assignment to other hosts 108 and the <channel,pipe,link ID> triple is available for assignment to another RF modem 106(k). Since only a small percentage of hosts 108 is active at a given time, dynamic assignment makes it possible to share a relatively small number ~~if~~ of IP addresses and <channel,pipe,link ID> triples among a much larger number of users. It should be further noted here that the binding between a <channel,pipe,link ID> triple and the set of IP addresses ~~210(j)~~ is also dynamic, i.e., what IP addresses correspond to a given <channel,pipe,link ID> triple is decided only when the IP addresses and the <channel,pipe,link ID> triple are assigned.

In the paragraph beginning on page 20, line 6:

FIG. 4 shows the interactions 701 between the components of cable data network 100 when a RF modem 106(i) is inactive and a user of host 108(j) connected to RF modem 106(i) wishes to become connected to Internet 150. The user executes routines in software 107 which cause host 108(j) to send a setup request to RF modem 106(i) at modem 106(i)'s address in LAN 133, as shown at 702. Included in the setup request is authentication information such as a user identification and password and the telephone number of telephone modem pool 135. RF modem 106 responds by first sending a dummy IP address to host 108(j) and then dialing the telephone number. Telephone modem pool 135 responds by setting up a Point-to-Point Protocol (PPP) link via PSTN 109 between RF modem 106 and a tmodem 110(k). Once this is done, RF modem 106 sends the authentication information to modem pool 135, which passes them on to control/management server 125. Control management server 125 then checks the authentication information, and if it is valid, control/management server 125 assigns an IP address in network A ~~206~~ to RF modem 106(i). It returns the IP address to RF modem 106(i). RF modem 106(i) can now use TCP/IP protocols to communicate with the head end devices connected to LAN 120.

In the paragraph beginning on page 21, line 13:

Modem pool 135 receives DHCPOFFER packet 703, adds modem pool 135's IP address to it, and broadcasts the packet on net A ~~206~~. DHCP server ~~1201~~in

Control/management server 125 responds to packet ~~703~~ 705 and assigns IP addresses to the hosts 108 attached to RF modem 106(j) and a <channel,pipe,link ID> triple to RF modem 106 as described above.

In the paragraph beginning on page 21, line 19:

Next, control/management server 125 sends a DHCPOFFER packet 715 addressed to RF modem 106's IP address. This is routed to ~~to~~ modem pool 135. The OFFER packet contains the following information:

Range of IP addresses for the hosts 108 connected to RF modem 106.

An IP address for RF modem 106 in Ethernet 133. As will be explained in more detail below, this IP address is not unique to RF modem 106.

the subnet mask for the host IP addresses.

IP addresses in network A ~~206~~ for a domain name server, for SNMP agent ~~1203~~, for communications manager 102, and for router 101.

Information about where RF modem 106 can obtain current firmware.

The <channel,pipe, link ID> triple that has been assigned to RF modem 106.

In the paragraph beginning on page 22, line 21:

In other embodiments, RF modem 106(i) may further respond to the DHCP OFFER packet ~~715~~ by sending an acknowledgment IP packet via PSTN 109 and modem pool 135 to communications manager 102 (719). Communications manager 102 responds to the acknowledgment by sending an acknowledgment 721 on the cable 132 at the frequency and pipe RF modem 106(i) is listening to. The acknowledgment contains at least RF modem 106(i)'s LinkID. Once RF modem 106(i) receives the acknowledgment, it informs host 108(i) which began the transaction of its new IP address. Host 108(i) then replaces the dummy IP address with the new IP address.

In the paragraph beginning on page 23, line 23:

The PC then sends the logon information (USERID, password and telephone number) to the cable modem. The modem then dials modem pool 135 over PSTN 109 and ~~request~~ requests access using the USERID and password. Modem pool 135 forwards the access request to control and management component 111 which performs the actual authentication and replies to modem pool 135 with an "accept" or "reject" command. This command is then forwarded on to modem 106.